

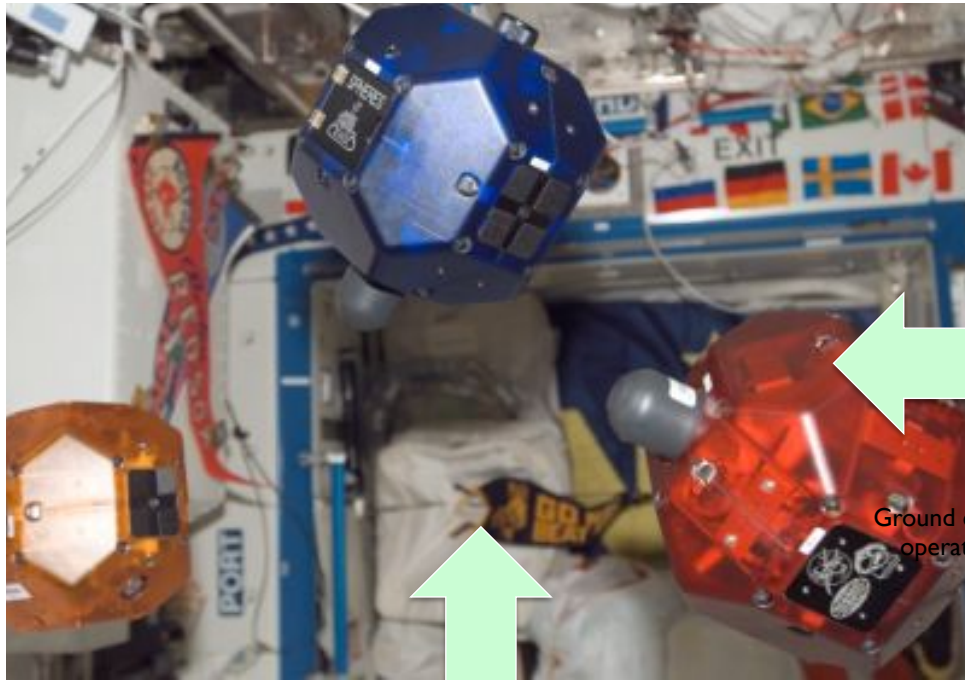
SMART SPHERES

The image shows four small, autonomous robots, each with a translucent, faceted spherical body. From left to right, the spheres are blue, orange, blue, and red. Each robot is mounted on a base with blue wheels and various sensors and actuators. The robots are positioned on a dark, highly reflective surface, which creates clear mirror images of the robots below them. The background is dark, and the lighting highlights the robots and their reflections.

Mark Micire, PhD
Intelligent Robotics Group / SPHERES National Lab
Carnegie Mellon / NASA Ames Research Center

Human Exploration Telerobotics (HET)

- Demonstrate & assess remote operation of advanced robots to increase productivity, reduce cost, and mitigate risk for future deep-space human exploration missions
- Improve the efficiency and productivity of human explorers
- Increase the return (science, engineering, etc.) of human missions
- Identify requirements, benefits, limitations, costs and risks of integrating advanced telerobotics into future exploration campaigns



Flight Barriers

- Procurement and certificates of conformance
- GSM 850Mhz frequencies not safe for ISS
- Cell phone lithium-polymer batteries are not flight certified
- Alkaline batteries are preferred and shipped on regular 6-month basis
- Glass breakage is a safety critical problem
- Mechanical drawings and assembly procedure
- Windows XP SP3 with new device and no driver support
- No time for software development!



[« Back to device](#)

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Nexus S Teardown



Teardown

Teardowns provide a look inside a device and should not be used as disassembly instructions.



Featured Guide

This guide has been found to be exceptionally cool by the iFixit staff.

★ x 18 💬 x 10

[Tweet](#) 1,230

[+1](#) 16

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Nearly one year after the release of the [Nexus One](#), Google, in partnership with Samsung, has released its second official phone the Nexus S. It has some fancy **gimmicks** features that separate it from other Android phones on the market, such as a curved display and the newest 2.3 Gingerbread update.

That's great and everything, but we wanted to see what makes this baby tick. So stay tuned as we dig deep into the Nexus S!

Like the teardown? You can now embed it in your site! Just hit the **embed** link below for the HTML code.

Tools

- Heat gun or hair dryer
- Phillips #00 Screwdriver
- Plastic Opening Tools

View: [Paginated](#) [Full width](#)

Formats: [Slideshow](#) [XML](#) [Embed](#)

[View](#)[Edit](#)[History](#)

Nexus S

Released December 2010, the second Nexus phone from Google.

[3 Step-by-step Guides](#)

[17 Solutions](#)

[Start a New Guide](#)

[Ask a Question](#)

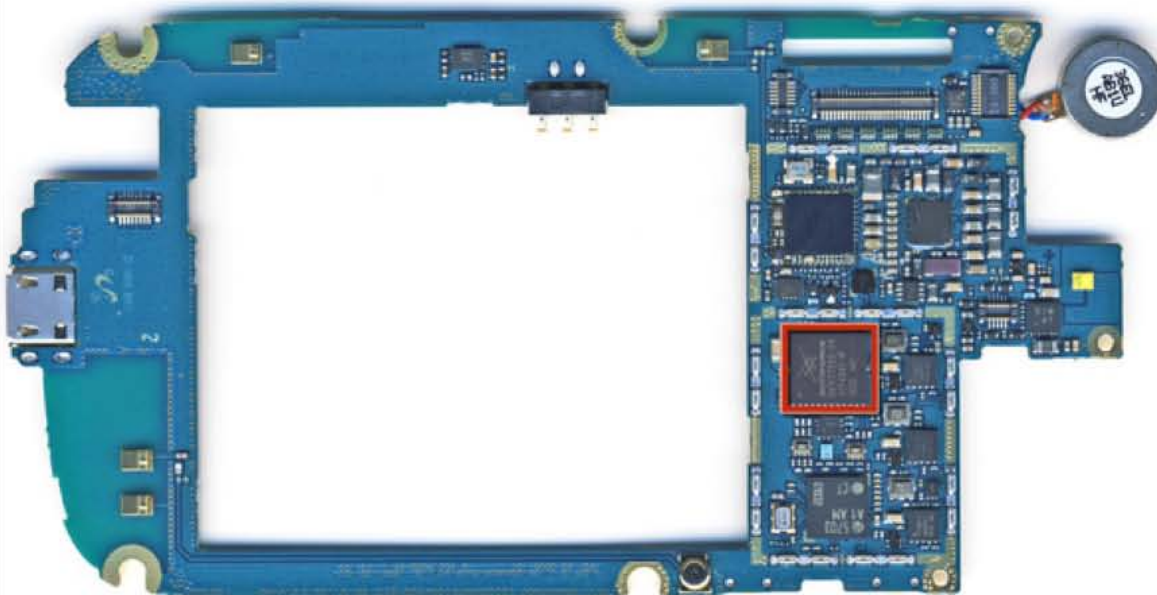
Powered by Dozuki
The easy way to make online manuals.



Step 1 — Nexus S Teardown

[Edit](#) [💬](#)

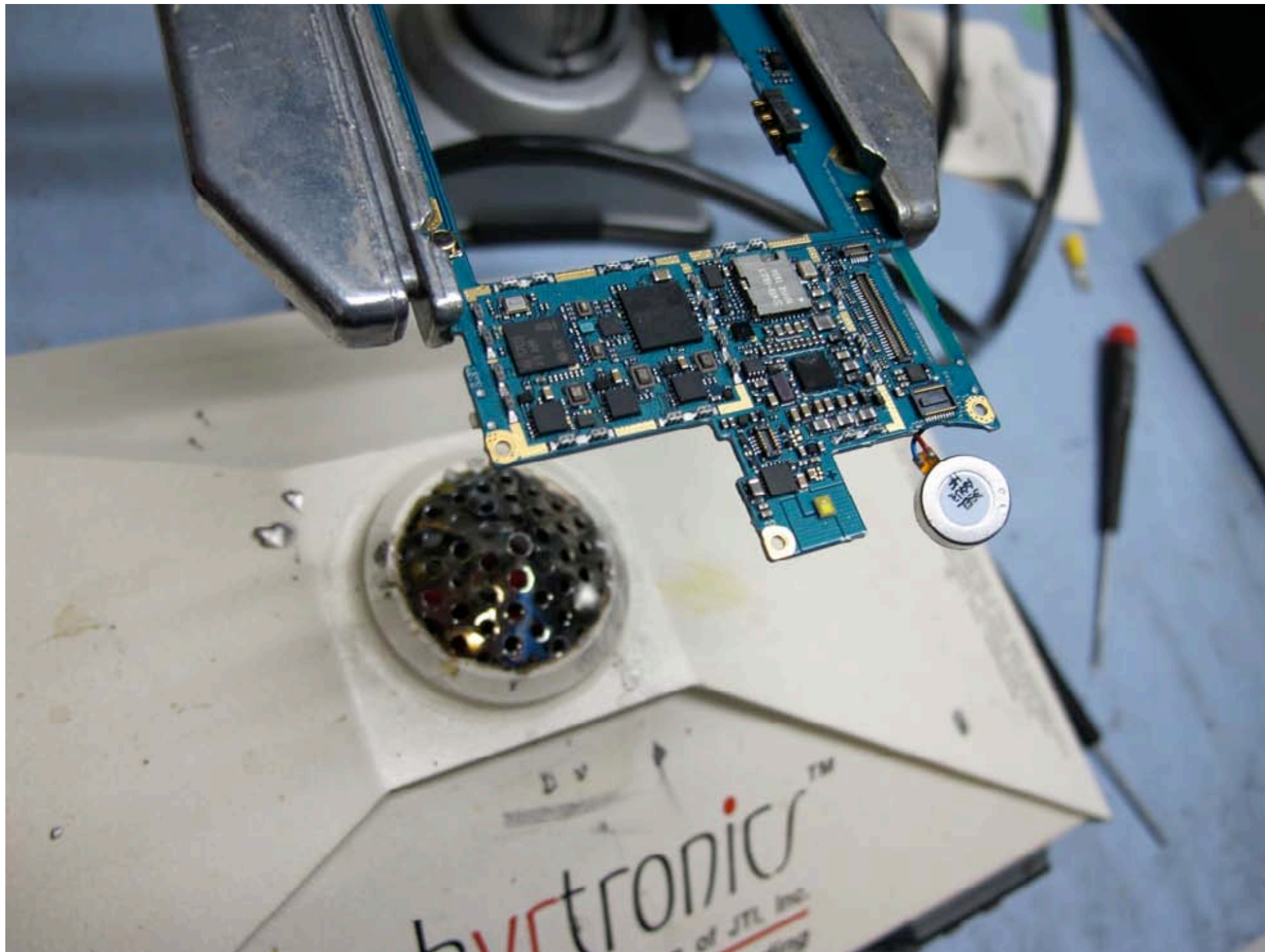
- The Nexus S is a variation of the Samsung Galaxy S, sporting more or less the same hardware specifications as its brethren.
- Notable changes to the Nexus S include NFC (Near Field Communication) support and a Super AMOLED Contour Display.
- Tech Specs:

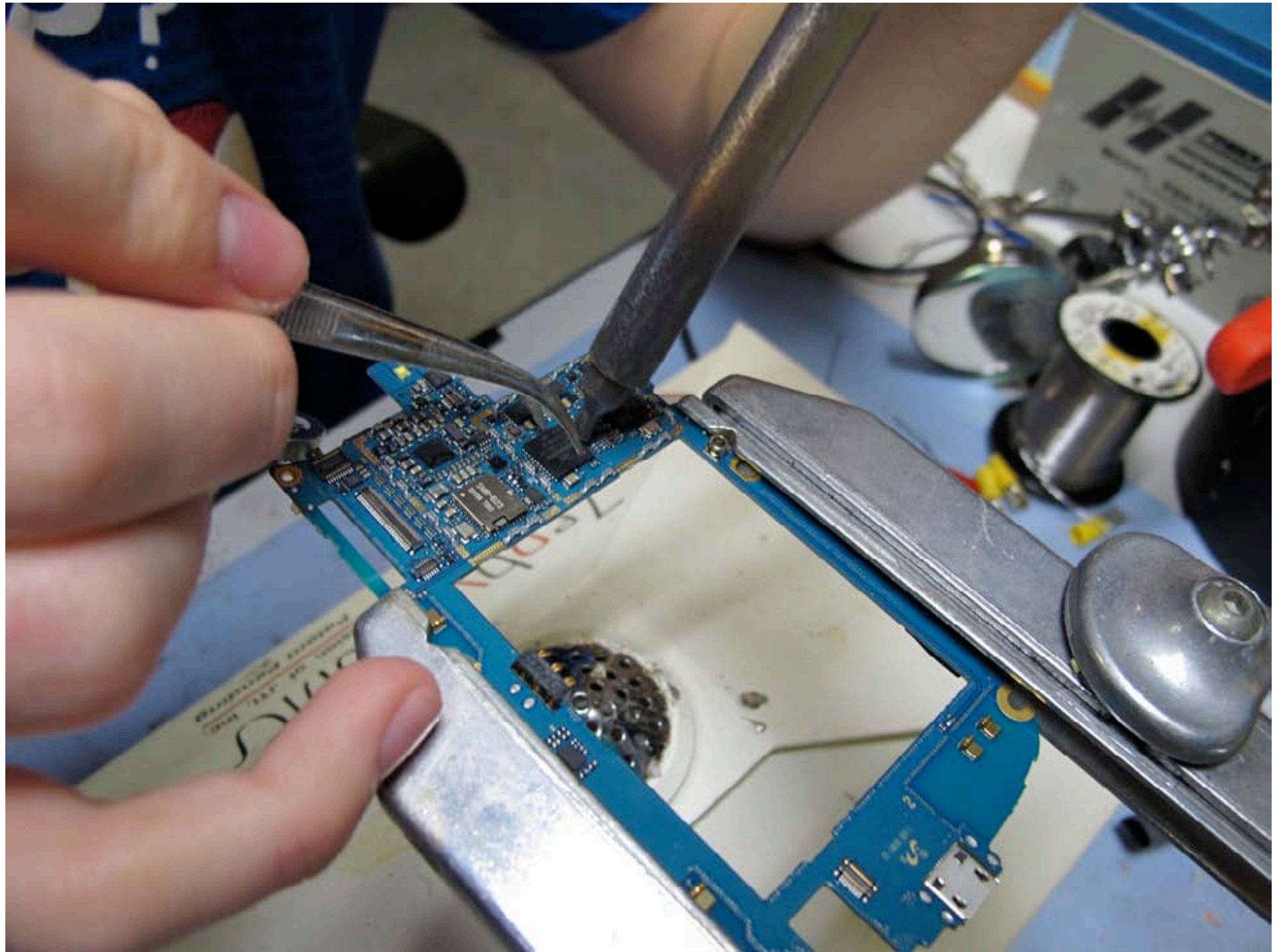


Step 10

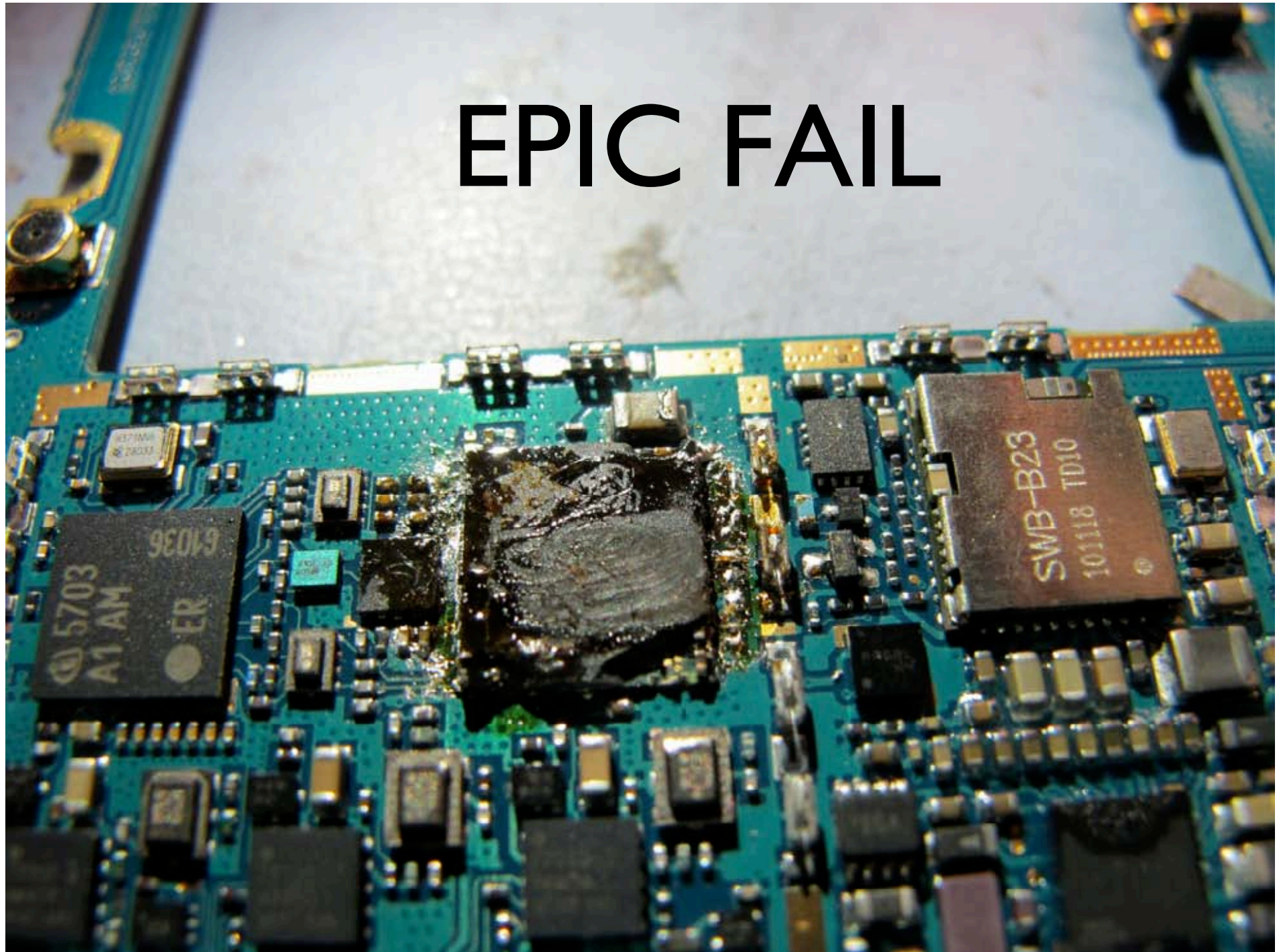
Edit 

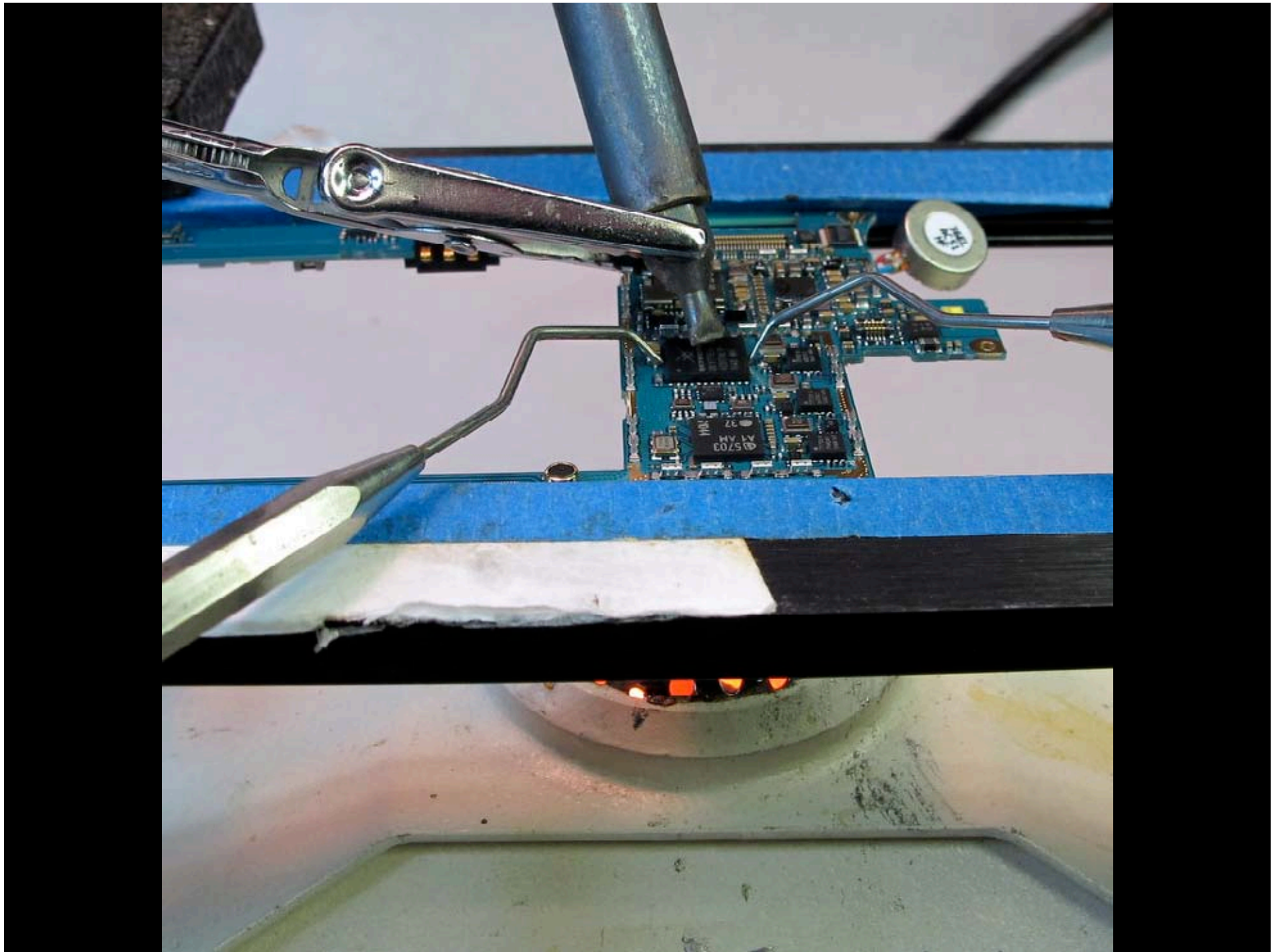
- Big players on the motherboard include:
 - Skyworks SKY77529 Tx Front-End Module for Dual-Band GSM / GPRS / EDGE
 - SanDisk SDIN4C2 16GB MLC NAND flash.
 - Samsung KB100D00WM-A453 memory package and S5PC110A01 1GHz Cortex A8 Hummingbird Processor.
 - Infineon 8824 XG616 X-Gold baseband processor
 - Wolfson Microelectronics WM8994 ultra-low power audio codec.

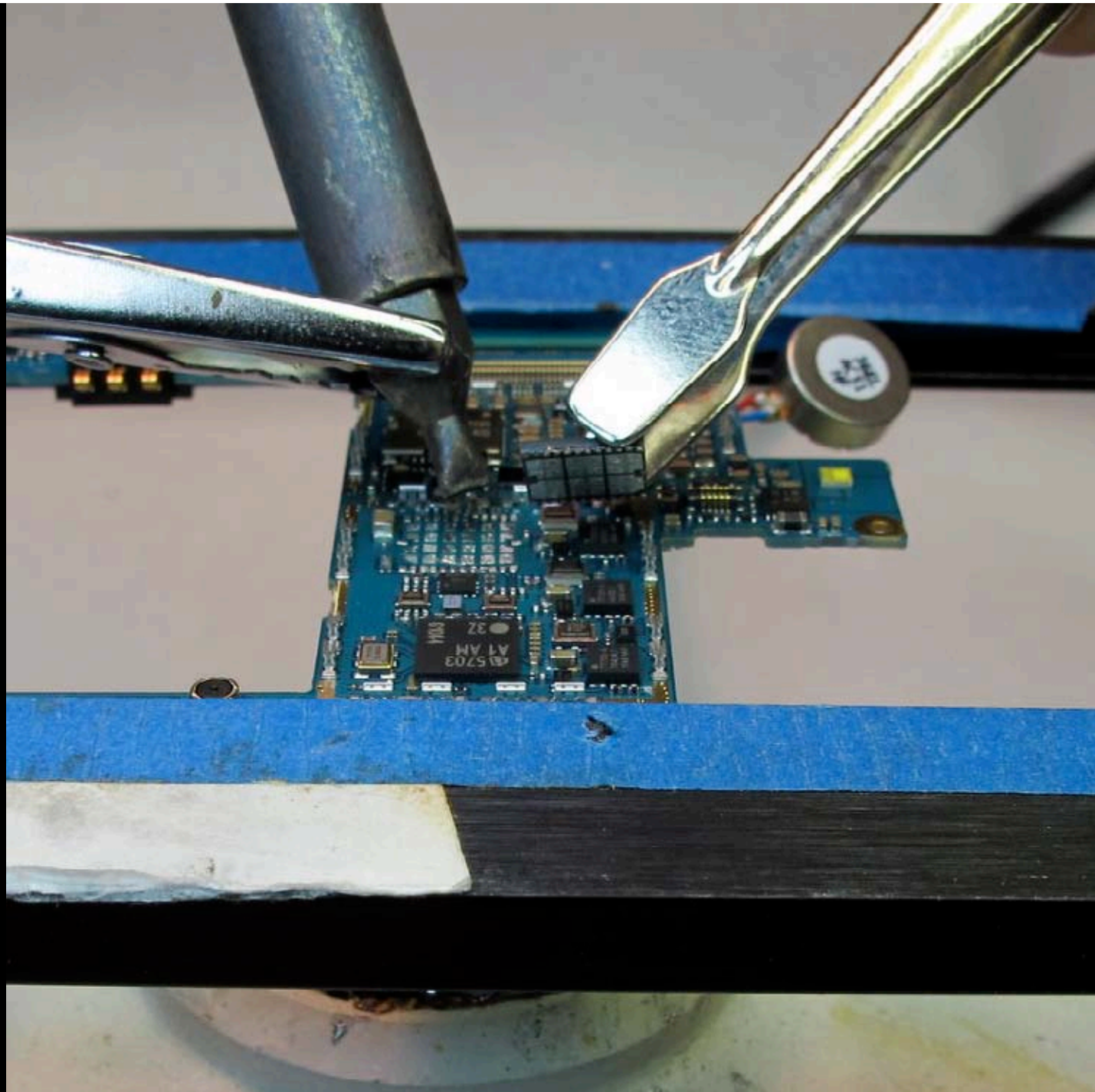




EPIC FAIL









Phone info

IMEI: 355031040079317

Phone number: unknown

Current network:

Run ping test

Ping IpAddr:

Ping Hostname(www.google.com):

HTTP Client test:

Signal strength: -111 dBm 1 asu

Location: LAC = unknown CID = unknown

Neighboring CID: unknown

Roaming: Not roaming

GSM service: Radio off

GPRS service: Disconnected

Network type: unknown

Message waiting: false

Call redirect: false

Call status: Idle

Radio resets: 0

Data attempts: 0

Data successes: 0

GSM disconnects: =====DATA=====

State: DcInactiveState







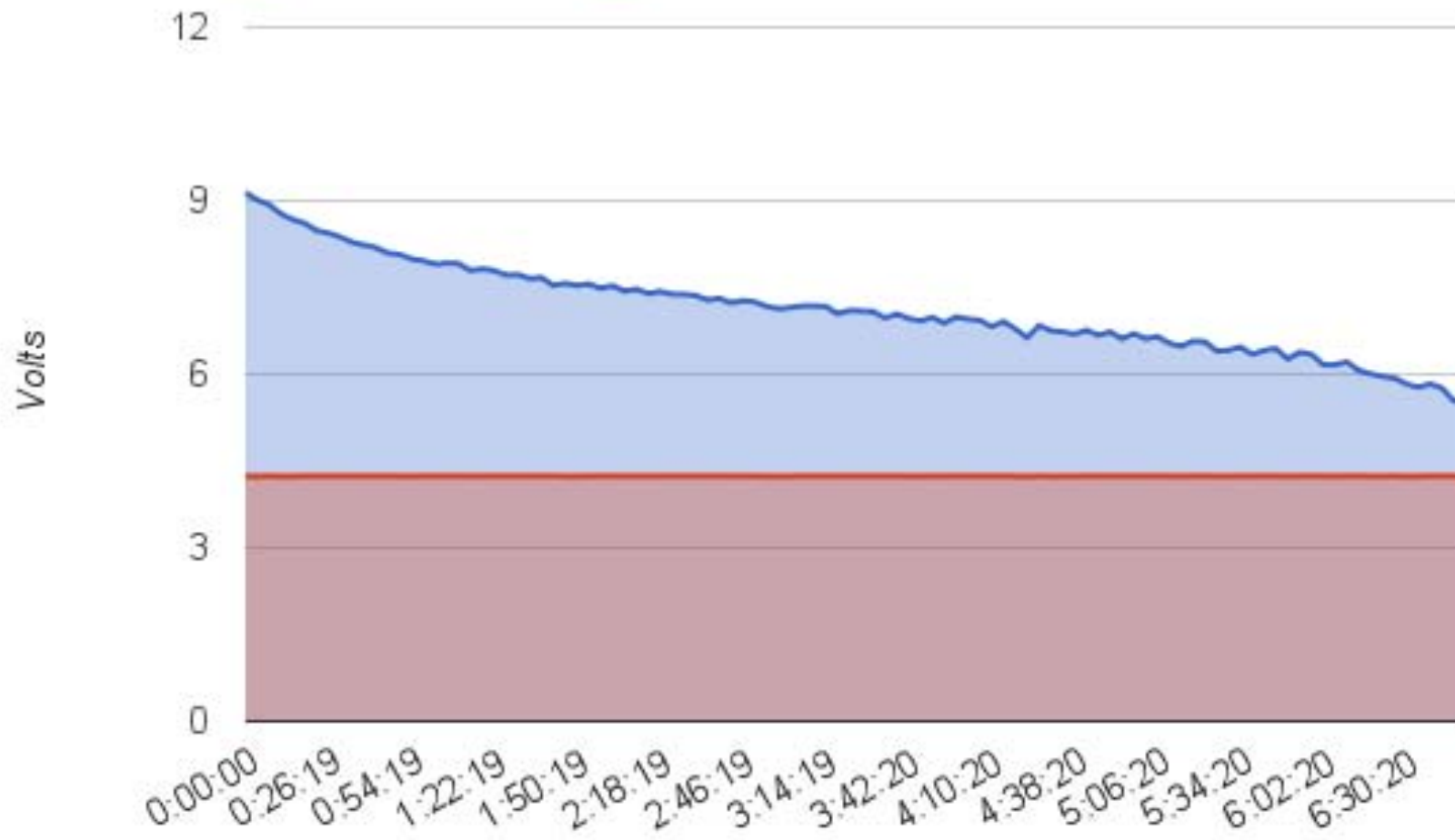


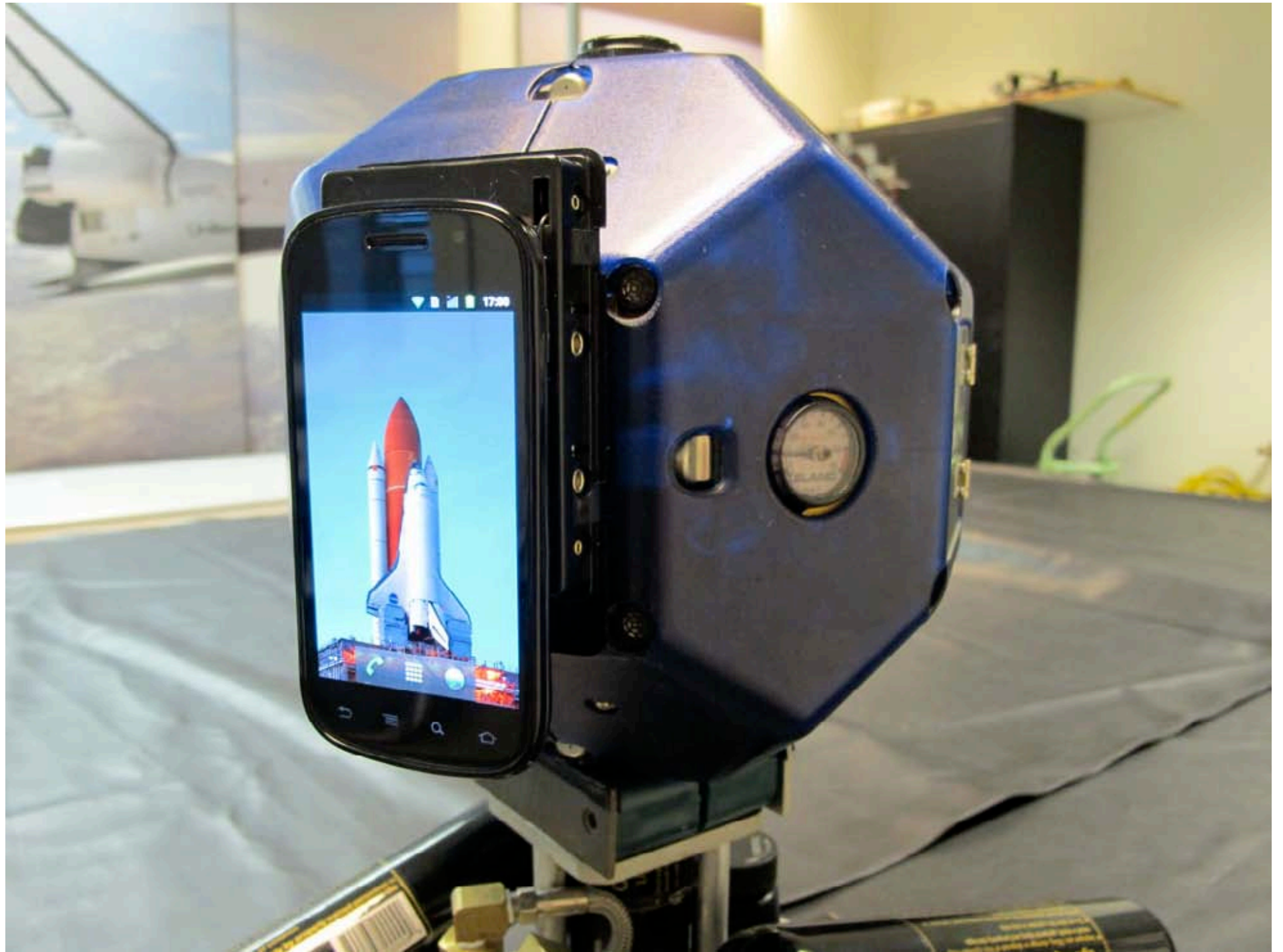




Alkaline Battery Discharge for Nexus-S

■ Battery Voltage ■ DC/DC Out Voltage











Recording

22:52

data

AccX: 0.24857

AccY: -0.09534

AccZ: 9.59553

GyrX: 0.01710

GyrY: 0.01221

GyrZ: -0.01221

MagX: 1.25

MagY: 22.5

MagZ: -12.1875

temp(C) storage(%)

← 34

← 47

Introducing Google Play

LEARN MORE

Google play

Search

SHOP

MY MUSIC

MY BOOKS

MY MOVIES

Sensor Data Logger

Cellbots

★★★★★ (51)

INSTALLED

✓

This app is compatible with all of your devices.

[+]

More from developer

Cellbots

CELLBOTS

★★★★★ (49)

Free

See more

OVERVIEW

USER REVIEWS

WHAT'S NEW

PERMISSIONS

Ryan Hickman +1'd this

Description

This is a sensor logging application for Android that will gather measurements from all available sensors while recording video or taking time lapse pictures. Data will be stored on the SD card under the "SmartphoneLoggerData" directory.

Source code available here:
<http://code.google.com/p/cellbots/source/browse/trunk/android/java/dataLogger/>

Visit Developer's Website > Email Developer >

App Screenshots

cellbots

Using Cellphones as Robotic Control Platforms

Search projects

Project Home

Downloads

Wiki

Issues

Source

Checkout

Browse

Changes

Search Trunk

Source path: [src/ trunk/ android/ java/ dataLogger/ src/ com/ cellbots/ logger/](#) [LoggerApplication.java](#) [r216](#) [r241](#) [Hide details](#)

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```

/*
 * Copyright (C) 2011 Google Inc.
 *
 * Licensed under the Apache License, Version 2.0 (the "License");
 * you may use this file except in compliance with the License. You may obtain
 * a copy of the License at
 *
 * http://www.apache.org/licenses/LICENSE-2.0
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 * Unless required by applicable law or agreed to in writing, software
 * distributed under the License is distributed on an "AS IS" BASIS,
 * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
 * See the License for the specific language governing permissions and
 * limitations under the License.
 */

package com.cellbots.logger;

import android.app.Application;
import android.os.Environment;

import java.util.Date;

public class LoggerApplication extends Application {
    /**
     * A date value is used as a unique identifier for file paths.
     */
    private String filePathUniqueIdentifier;

    @Override

```

Change log

r241

by clc...@google.com on Jul 15, 2011

Diff

Adding missing contentDescriptions, adding an option to turn off zipping, implementing a workaround for camera hardware issues.

Go to:

Older revisions

r216

by clc...@google.com on Mar 9, 2011

Diff

r215

by clc...@google.com on Mar 7, 2011

Diff

All revisions of this file

File info

Size: 2561 bytes, 78 lines

[View raw file](#)

Flight Barriers

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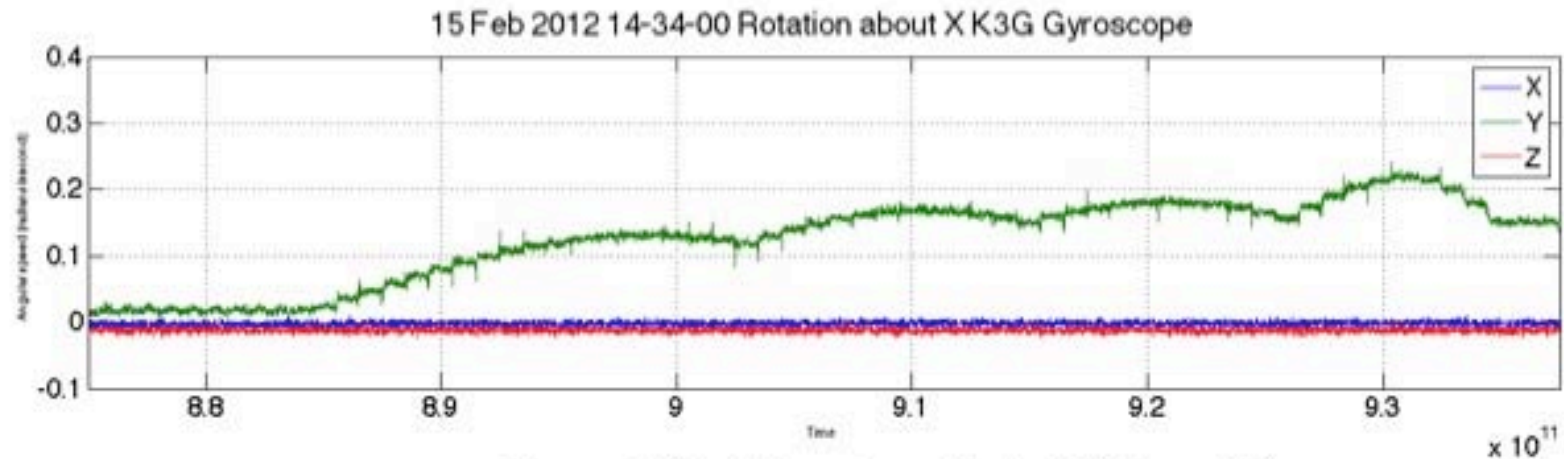




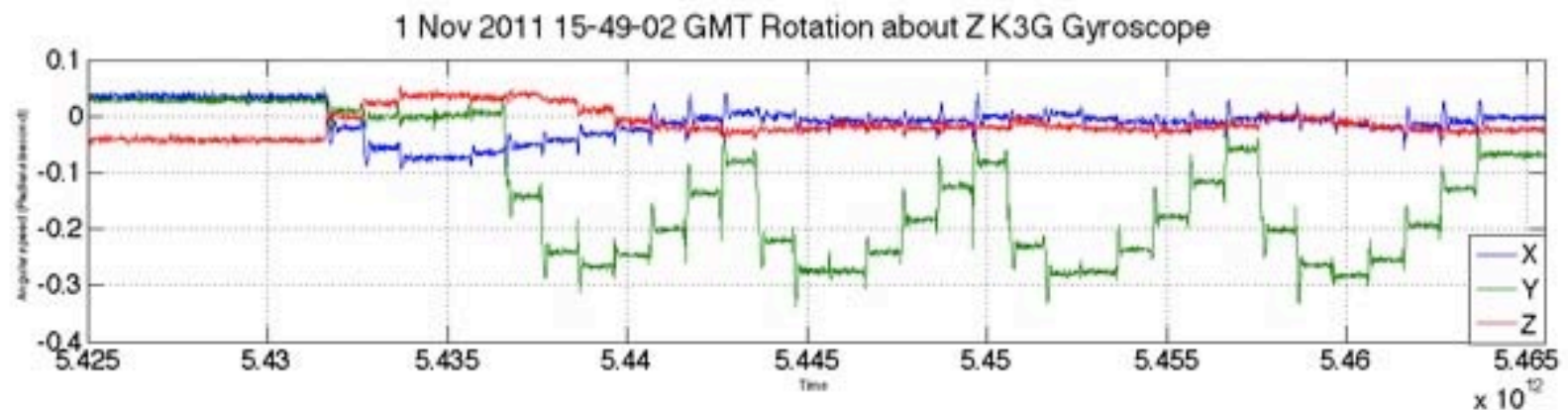




Gyroscope - Rotation about Y

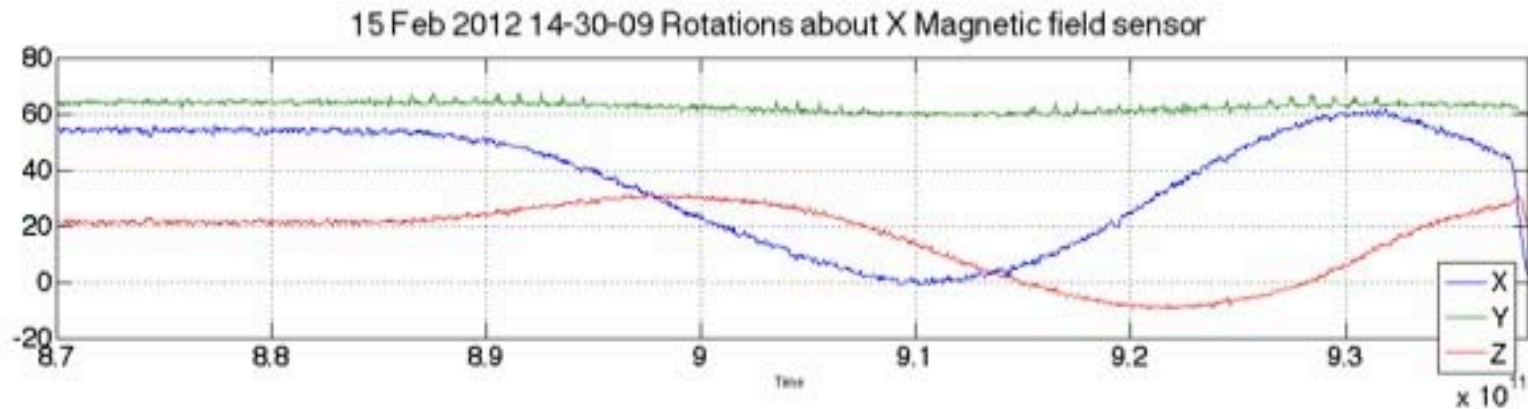


Ground (Rotation about Lab X (Phone Y))

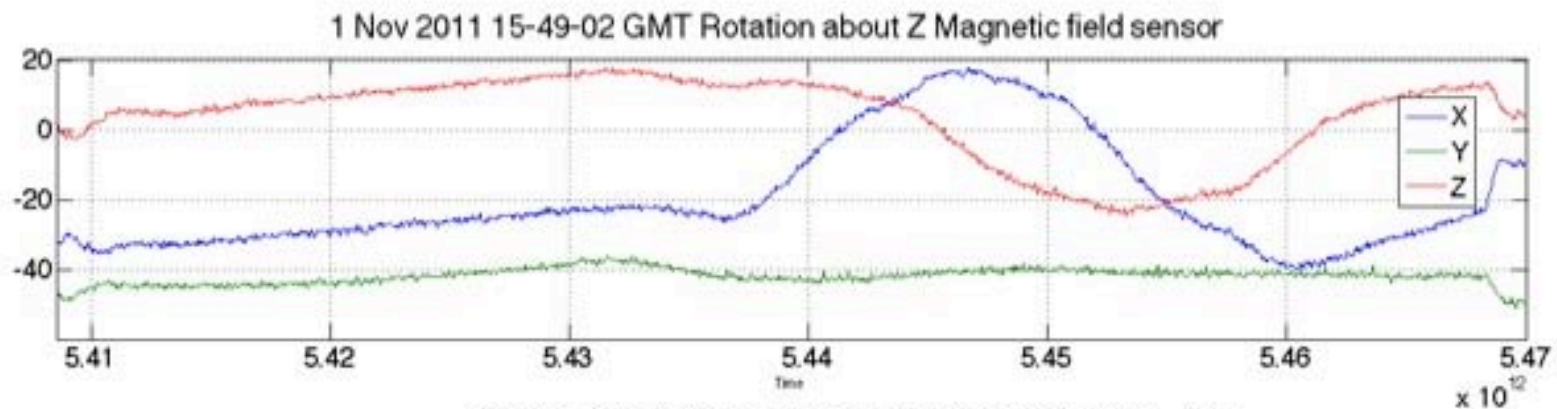


Orbit (Rotation about JEM Z (Phone -Y))

Magnetometer - Rotation about Y

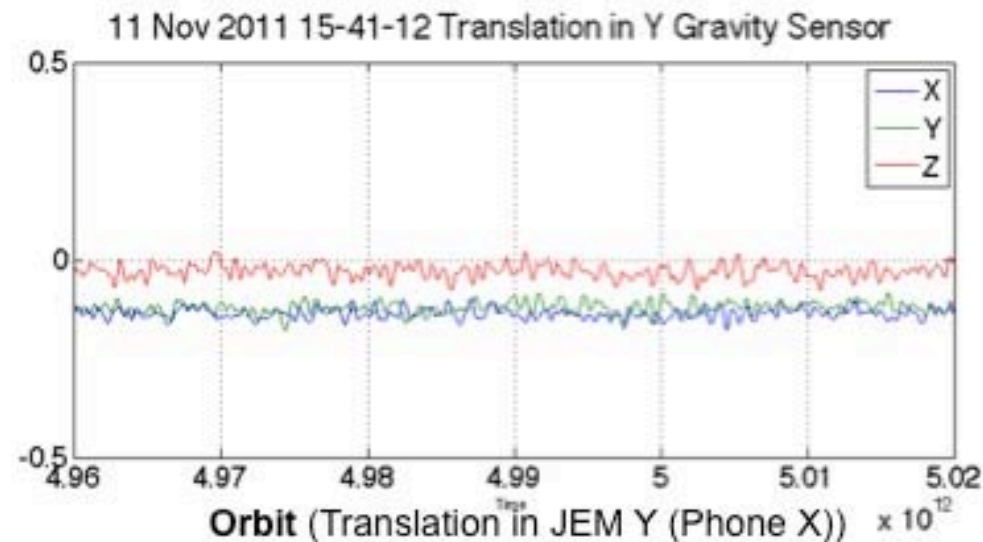
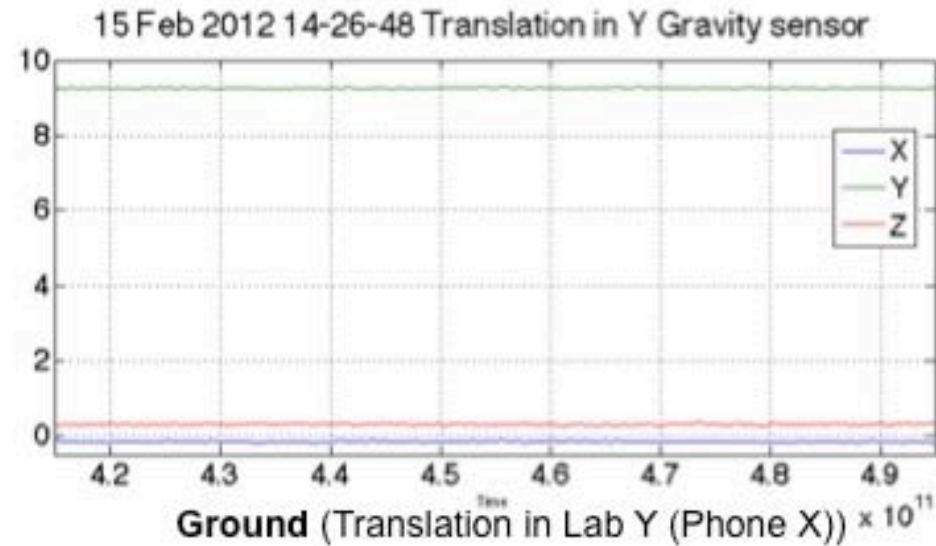


Ground (Rotation about Lab X (Phone Y))

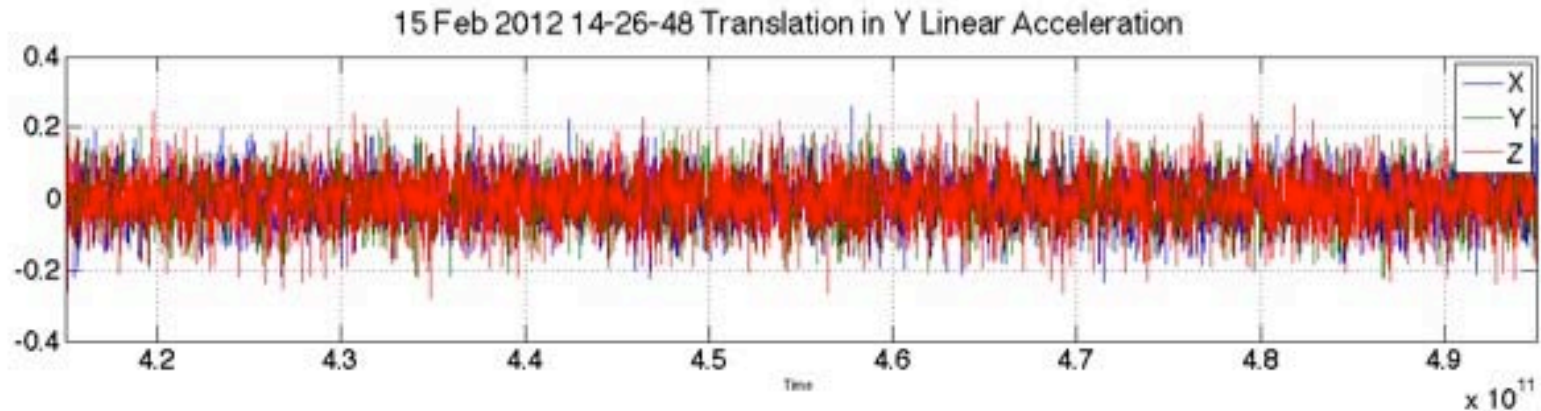


Orbit (Rotation about JEM Z (Phone -Y))

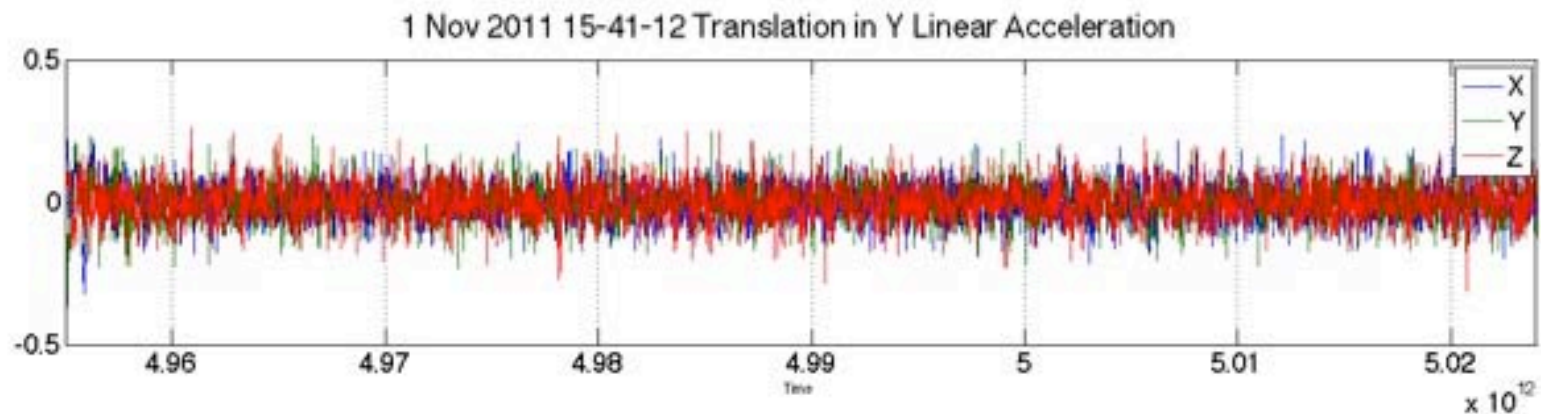
Gravity Sensor - X Translation



Linear Accelerometer - X Translation

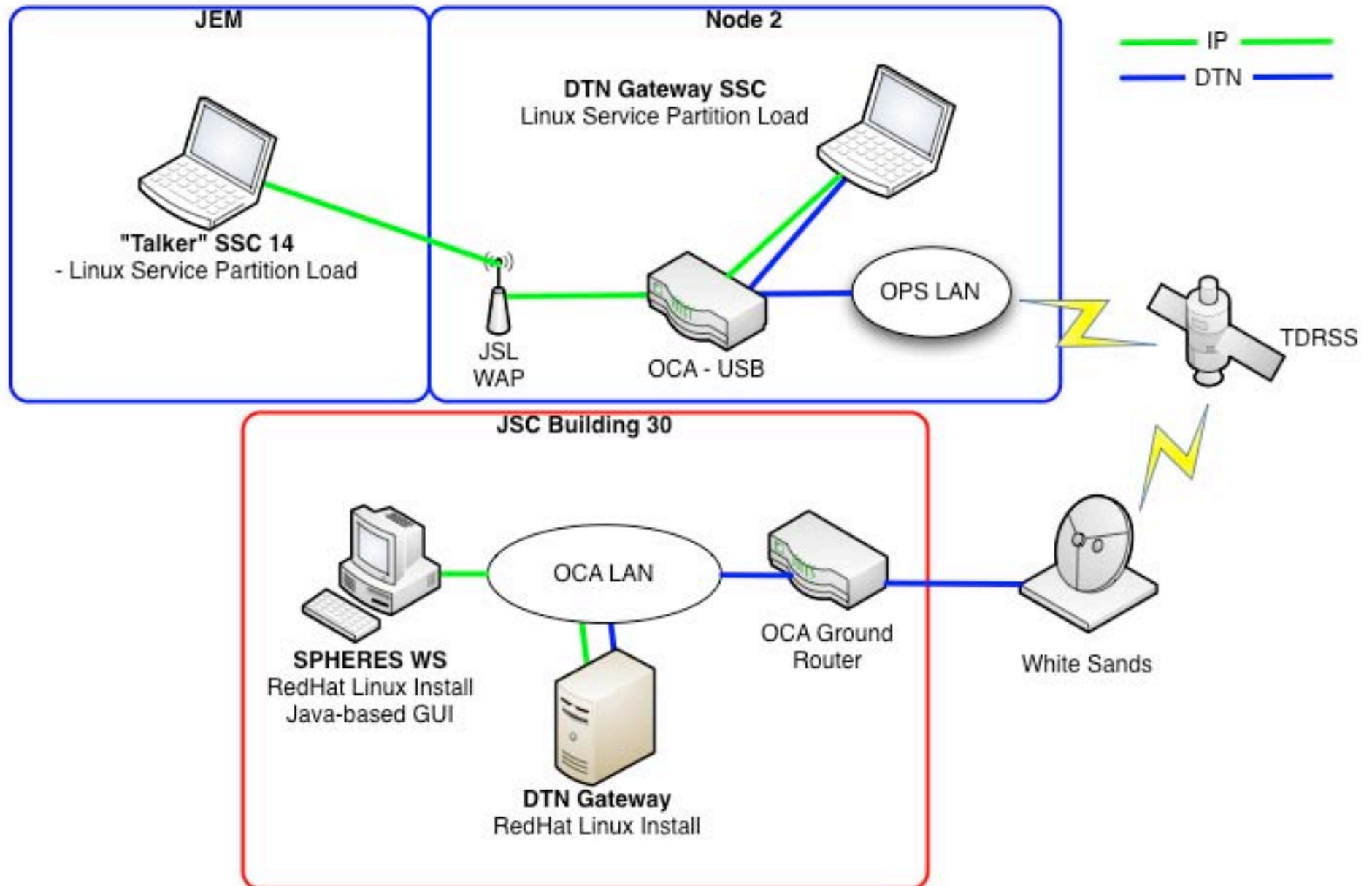


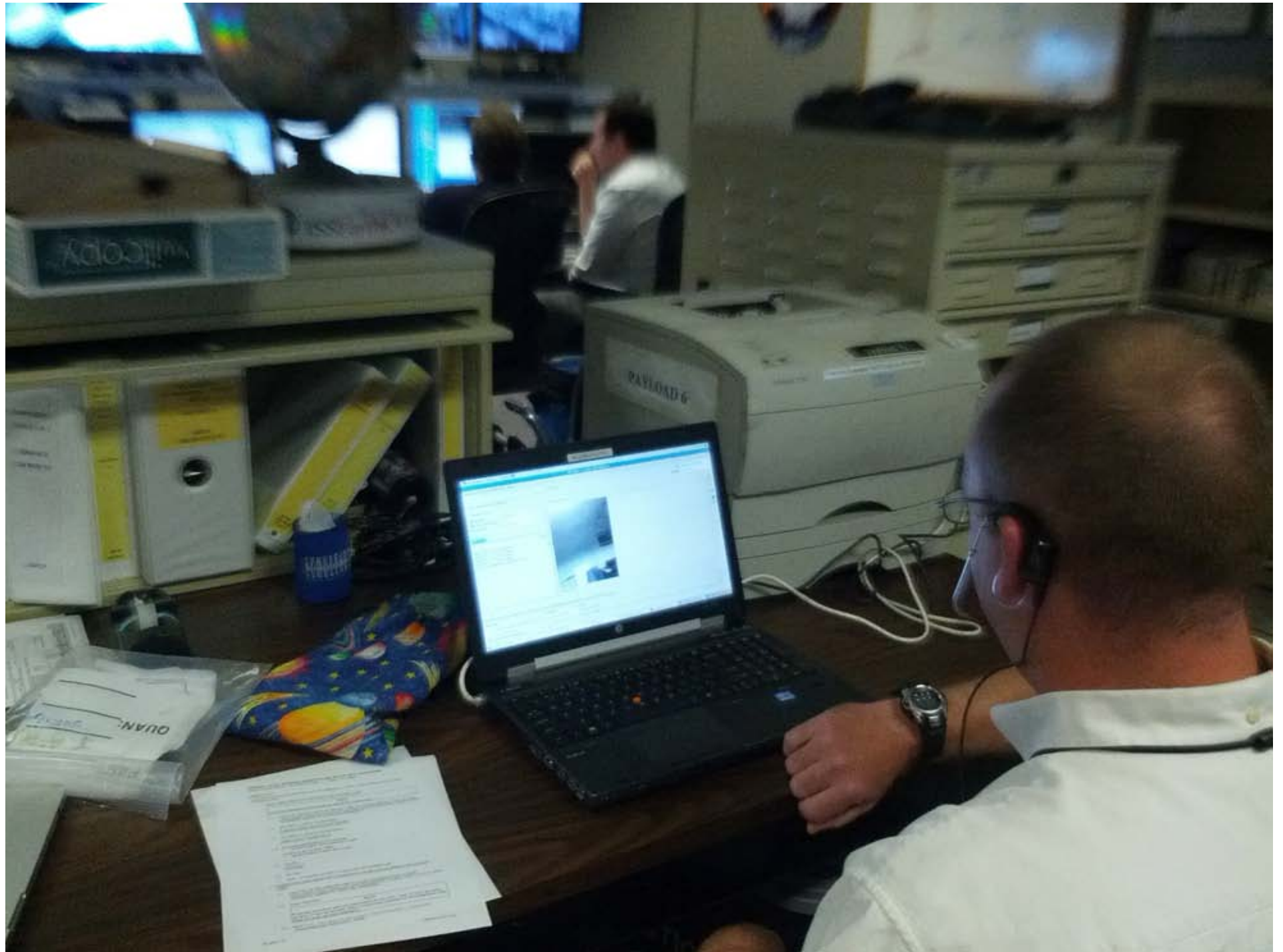
Ground (Translation in Lab Y (Phone X))



Orbit (Translation in JEM Y (Phone X))

Dry-Run Network Configuration

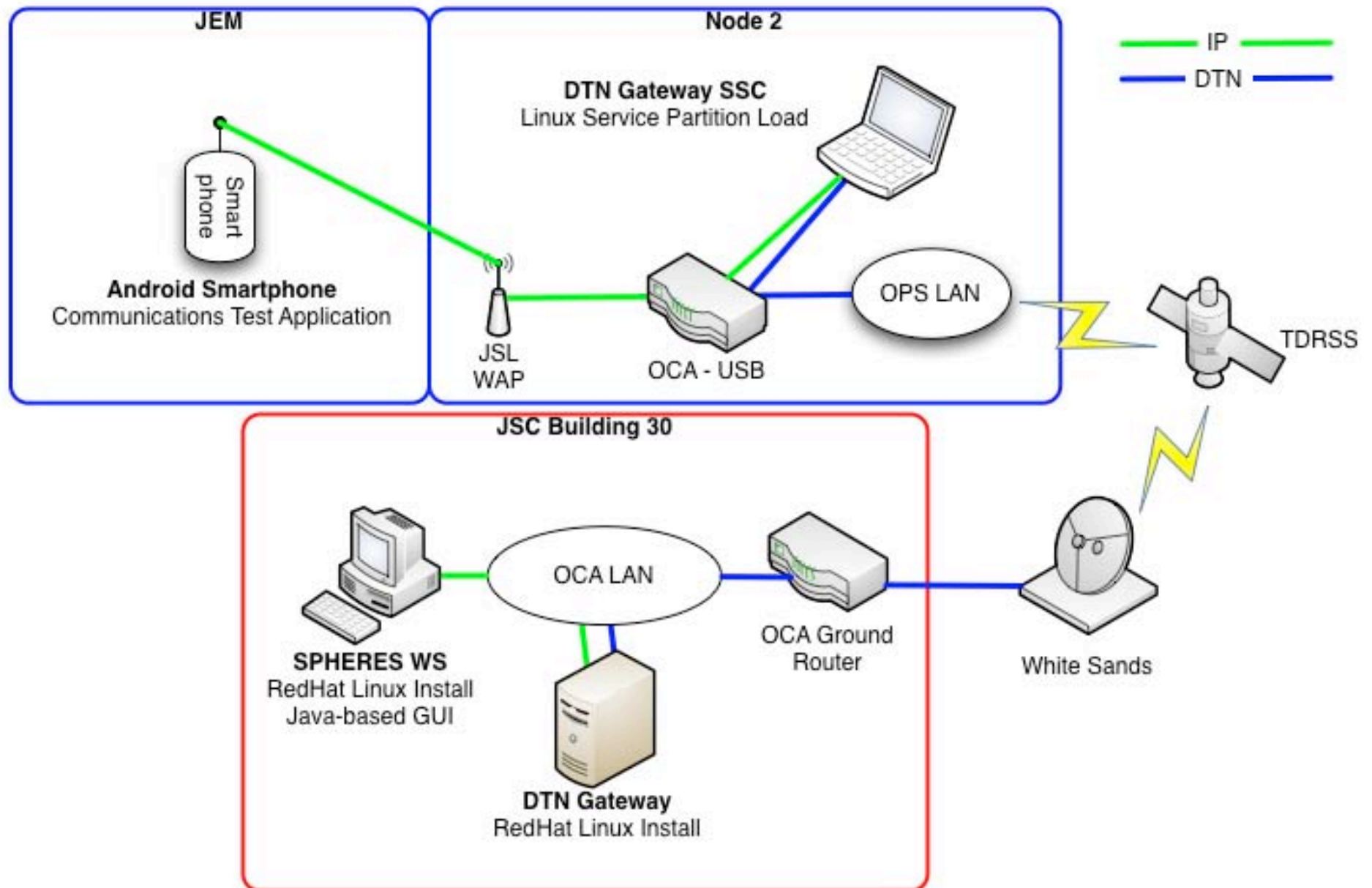


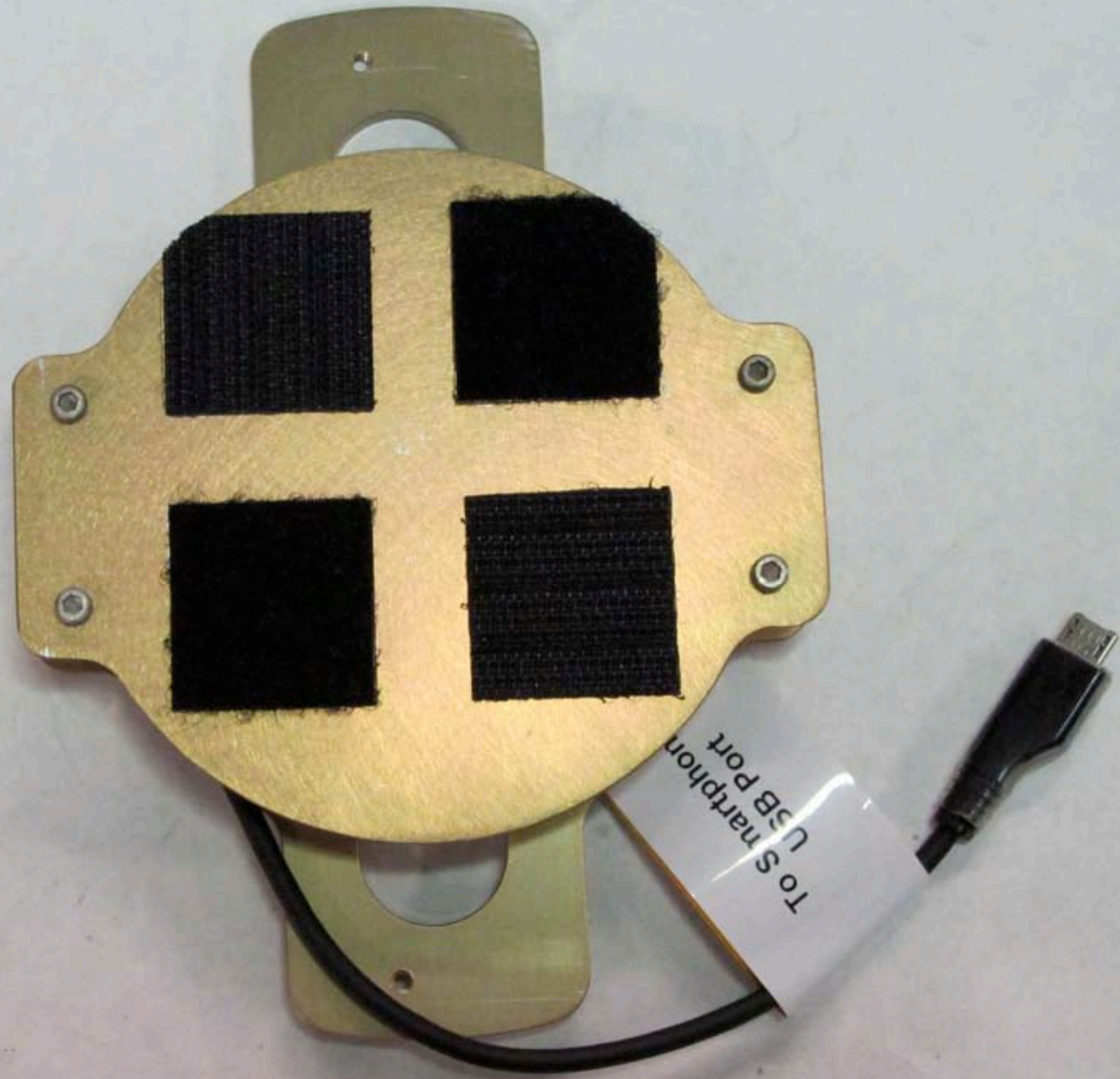






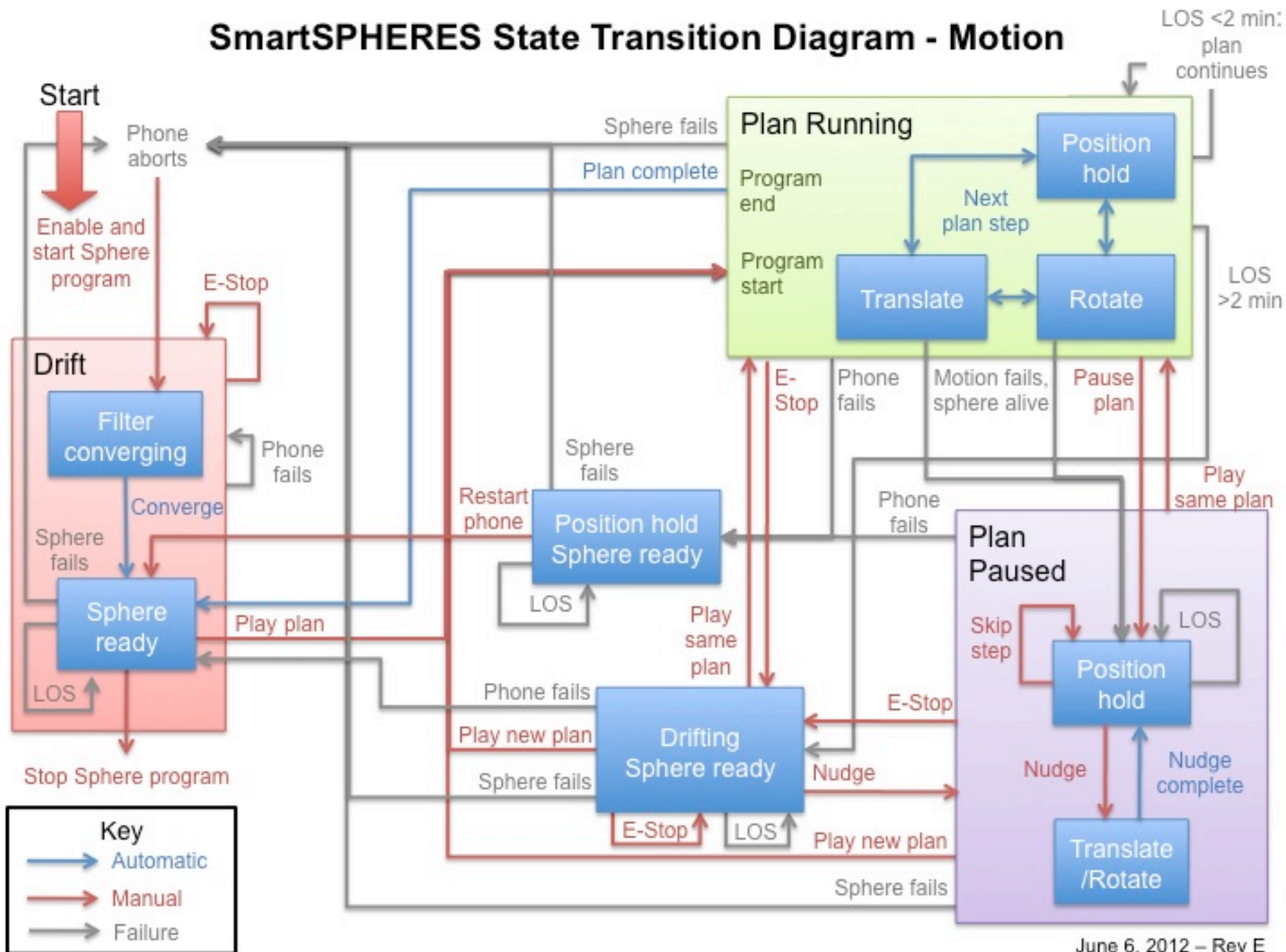
Comms Test Network Configuration

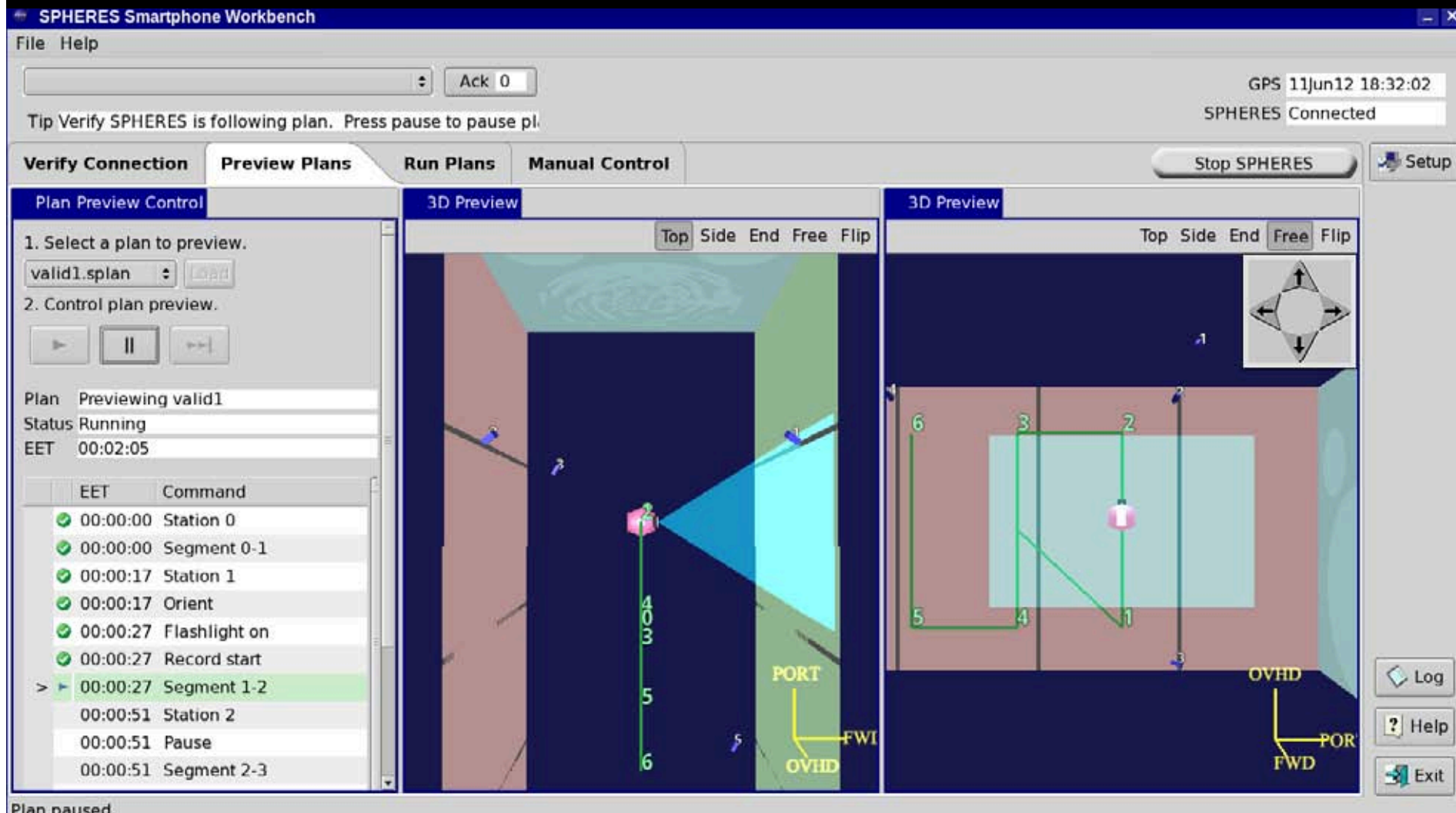






SmartSPHERES State Transition Diagram - Motion





SPHERES Smartphone Workbench

File Help

Ack 0

GPS 11Jun12 18:32:17

SPHERES Connected

Tip Connect to SPHERES and pause the plan to use manual coi

Verify Connection

Preview Plans

Run Plans

Manual Control

Stop SPHERES

Setup

Run Plan Control

1. Upload plan to SPHERES.

valid1.splan Upload

2. Control plan on SPHERES.

▶

⏸

⏭

Plan Running valid1

Status Running

Time 00:00:07

Time	Command
✓	Station 0
✓ 00:00:03	Segment 0-1
✓	Station 1
✓ 00:00:03	Orient
	Flashlight on
	Record start
	Segment 1-2
	Station 2
	Pause
	Segment 2-3

Image Sensor

Mark Damage


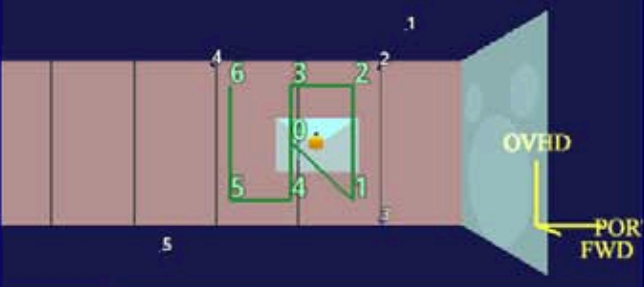


Image #1

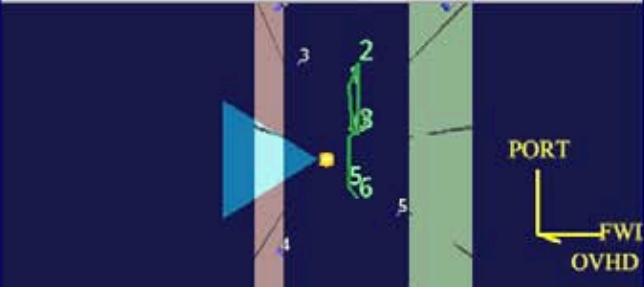
3D Live

Top Side End Free Flip



3D Live

Top Side End Free Flip



Log

Help

Exit

Completed orient

